

PATENT COOPERATION TREATY
PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

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| Applicant's or agent's file reference 36538972WO01 | FOR FURTHER ACTION | |
| | See item 4 below | |
| International application No. PCT/US2005/004015 | International filing date (<i>day/month/year</i>) 11 February 2005 (11.02.2005) | Priority date (<i>day/month/year</i>) 11 February 2004 (11.02.2004) |
| International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237 | | |
| Applicant AWARE, INC. | | |

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|-------------------------------------|--|---|-------------------------------------|-----------|---------------------|--------------------------|------------|----------|-------------------------------------|-------------|--|--------------------------|------------|----------------------------|-------------------------------------|-----------|---|--------------------------|------------|-------------------------|-------------------------------------|-------------|--|-------------------------------------|--------------|---|
| | <p>1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 bis.1(a).</p> <p>2. This REPORT consists of a total of 10 sheets, including this cover sheet.</p> <p>In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.</p> | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3. | <p>This report contains indications relating to the following items:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;"><input checked="" type="checkbox"/></td> <td style="width: 15%;">Box No. I</td> <td>Basis of the report</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. II</td> <td>Priority</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table> | | <input checked="" type="checkbox"/> | Box No. I | Basis of the report | <input type="checkbox"/> | Box No. II | Priority | <input checked="" type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability | <input type="checkbox"/> | Box No. IV | Lack of unity of invention | <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement | <input type="checkbox"/> | Box No. VI | Certain documents cited | <input checked="" type="checkbox"/> | Box No. VII | Certain defects in the international application | <input checked="" type="checkbox"/> | Box No. VIII | Certain observations on the international application |
| <input checked="" type="checkbox"/> | Box No. I | Basis of the report | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | Box No. II | Priority | | | | | | | | | | | | | | | | | | | | | | | | |
| <input checked="" type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | Box No. IV | Lack of unity of invention | | | | | | | | | | | | | | | | | | | | | | | | |
| <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | Box No. VI | Certain documents cited | | | | | | | | | | | | | | | | | | | | | | | | |
| <input checked="" type="checkbox"/> | Box No. VII | Certain defects in the international application | | | | | | | | | | | | | | | | | | | | | | | | |
| <input checked="" type="checkbox"/> | Box No. VIII | Certain observations on the international application | | | | | | | | | | | | | | | | | | | | | | | | |
| 4. | <p>The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).</p> | | | | | | | | | | | | | | | | | | | | | | | | | |

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| | Date of issuance of this report 14 August 2006 (14.08.2006) |
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PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

REC'D 25 MAY 2005

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To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION See paragraph 2 below

| | | |
|--|--|--|
| International application No. PCT/US2005/004015 | International filing date (day/month/year) 11.02.2005 | Priority date (day/month/year) 11.02.2004 |
|--|--|--|

International Patent Classification (IPC) or both national classification and IPC
H04B3/46, H04B3/48

Applicant
AWARE, INC.

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2005/004015

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 a sequence listing
 table(s) related to the sequence listing
 - b. format of material:
 in written format
 in computer readable form
 - c. time of filing/furnishing:
 contained in the international application as filed.
 filed together with the international application in computer readable form.
 furnished subsequently to this Authority for the purposes of search.
3. In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2005/004015

Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

- the entire international application,
 claims Nos. 6, 12, 14-19

because:

- the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):
 the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 6, 12, 14-19 are so unclear that no meaningful opinion could be formed (*specify*):
see separate sheet
- the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.
 no international search report has been established for the whole application or for said claims Nos.
 the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:

the written form

- has not been furnished
 does not comply with the standard

the computer readable form

- has not been furnished
 does not comply with the standard

- the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-bis of the Administrative Instructions.
- See separate sheet for further details

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2005/004015

**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or
industrial applicability; citations and explanations supporting such statement**

1. Statement

| | | | |
|-------------------------------|------|--------|---------------|
| Novelty (N) | Yes: | Claims | 1-5, 7-11, 13 |
| | No: | Claims | |
| Inventive step (IS) | Yes: | Claims | 1-5, 7-11, 13 |
| | No: | Claims | |
| Industrial applicability (IA) | Yes: | Claims | 1-5, 7-11, 13 |
| | No: | Claims | |

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item III

Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

- 1 The claims are not concise contrary to the requirements of Article 6 PCT.
- 2 Although claims 1 and 6 have been drafted as separate independent claims, they appear to relate effectively to the same subject-matter and to differ from each other only with regard to the definition of the subject-matter for which protection is sought. The aforementioned claims therefore lack conciseness and as such do not meet the requirements of Article 6 PCT.
- 3 Furthermore, claim 6 is formulated in such a brief manner that it is unclear exactly what protection is sought.
- 4 Although 7, 12, 15 and 19 have been drafted as separate independent claims, they appear to relate effectively to the same subject-matter and to differ from each other only with regard to the definition of the subject-matter for which protection is sought and in respect of the terminology used for the features of that subject-matter. The aforementioned claims therefore lack conciseness and as such do not meet the requirements of Article 6 PCT.
- 5 Furthermore, claims 12 and 19 are formulated in such a brief manner that it is unclear exactly what protection is sought.
- 6 Although claims 13 and 14 have been drafted as separate independent claims, they appear to relate effectively to the same subject-matter and to differ from each other only in respect of the terminology used for the features of that subject-matter. The aforementioned claims therefore lack conciseness and as such do not meet the

requirements of Article 6 PCT.

- 7 Claims 6, 12, 14-19 are therefore not examined.
- 8 The remaining claims lack clarity to a minor extent (cf. Re Item VIII). They are examined under the assumptions made in section Re Item VIII.

Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

- 9 Reference is made to the following documents:
 - D1: EP-A-1 248 383 (ALCATEL) 9 October 2002
 - D2: WO 02/087103 A (AWARE, INC) 31 October 2002
 - D3: WO 01/24482 A (TELCORDIA TECHNOLOGIES, INC) 5 April 2001
- 10 Document D1, which is considered to represent the most relevant state of the art, discloses (cf. passages cited in the International Search Report) a method for channel capacity estimation from which the subject-matter of claim 1, if corrected according to the comments under Re Item VIII, differs in that it further comprises the features:
 - determining a theoretical TDR echo for a plurality of *reference loop lengths each having a particular gauge of which the data rate is known,*
 - estimating an equivalent TDR length involving an optimization *between the measured TDR echo and the theoretical TDR echoes for the reference loop lengths,*

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.
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- *correcting* the equivalent TDR-length and
- utilizing the *corrected* TDR length to predict one or more of the upstream and downstream data rates.

- 11 The subject-matter of claim 1, if corrected according to the comments under Re Item VIII, is therefore novel (Article 33(2) PCT).
- 12 The problem to be solved by the present invention may therefore be regarded as simplifying the existing method.
- 13 The solution to this problem proposed in claim 1, if corrected according to the comments under Re Item VIII, of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:
- 14 The methods proposed in documents D1, D2 and D3 all attempt to model the subscriber line network through known or assumed topologies. Based thereon parameters are optimised through minimisation algorithms. These methods deliver reliable results at the cost of complex processing.
- 15 None of the available prior art suggests the steps mentioned under point 10 to simplify the method for channel capacity estimation.
- 16 Claims 2-5 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.
- 17 Claim 7 relates to a channel capacity estimation system corresponding to the method of claim 1 and as such also meets the requirements of the PCT with respect to novelty and inventive step.

- 18 Claims 8-11 are dependent on claim 7 and as such also meet the requirements of the PCT with respect to novelty and inventive step.
- 19 Claim 13 relates to an information storage media having stored thereon information configured to estimate channel capacity, the information corresponding to the steps of the method of claim 1, and as such also meets the requirements of the PCT with respect to novelty and inventive step.

Re Item VII

Certain defects in the international application

- 20 Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the document D1 is not mentioned in the description, nor is this document identified therein.
- 21 The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

Re Item VIII

Certain observations on the international application

- 22 In claim 1 the feature "determining a theoretical TDR echo for a plurality of loop lengths" is unclear in that according to the description on page 23, [0091] it is essential that the data rate of the associated gauge should be known. It is therefore assumed that the feature should read "determining a theoretical TDR echo for a plurality of *reference* loop

lengths each having a particular gauge of which the data rate is known."

- 23 Further, the feature "estimating the equivalent TDR length based on an optimization" is unclear in that the equivalence is not defined. It is therefore assumed that the feature should read "estimating an equivalent TDR length involving an optimization between the measured TDR echo and the theoretical TDR echoes for the reference loop lengths"
- 24 Even further, the feature "updating the equivalent TDR length" is unclear in that the description on page 24, [0093] mentions correcting of the equivalent TDR length. It is therefore assumed that the feature should read "correcting the equivalent TDR-length". Also, the following feature should then read "utilizing the corrected TDR length to predict one or more of the upstream and downstream data rates."
- 25 The observations mentioned under points 22-24 apply mutatis mutandis to claims 7 and 13.
- 26 In the description on page 10, [0043] it is stated that the links can be wireless. It is, however, impossible to characterise the transmission capability of a wireless link solely by measuring the reflection received at the transmitter due to its transmission. Since the person skilled in the art is not presented with a disclosure of the invention in a manner sufficiently clear and complete for the invention to be carried out if it were to be extended to wireless links, the passage contravenes the requirement of Article 5 PCT.
- 27 The vague and imprecise statement in the description on page 26, [0099], last line implies that the subject-matter for which protection is sought may be different to that defined by the claims, thereby resulting in lack of clarity (Article 6 PCT) when used to interpret them.